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A NEW GENUS AND SPECIES OF AMERICAN NAIADES

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The generic diagnosis, and the anatomical work on which it is based, was done by Ortmann. The determination of the specific distinctness of the form was made by Walker before any anatomical work had been done and the specific description has been prepared by him.

QUINCUNCINA Ortmann.

The genus *Quincuncina* is founded upon the new species *Quincuncina burkei* Walker. I have received from the late H. H. Smith from the Choctahatchee River, Blue Springs, Barbour County, Ala., several shells and the soft parts of seven other, five males, one barren and one gravid female, the latter collected May 12, 1915.

Supraanal opening present, separated from the anal by a short mantle-connection. Anal opening about as long as the supraanal, its inner edge finely crenulated. Branchial opening about as large as the anal with distinct papillæ. Palpi sub-falciform, their posterior margins connected for about one-half of their length.

Gills of normal Unione shape and structure. Inner lamina of inner gill free from abdominal sac except at its anterior end. Since the gill is rather short, the connected portion is about

one-third the length of the abdominal sac. Gill diaphragm of the usual type.

Septa of the gills, in the male, moderately developed, not very closely set; in the female, *all four gills serve as marsupium*, and the septa are strongly developed and stand close together. When gravid, the gills do not swell much and the ovisacs (water-tubes) are filled with *subcylindrical* placentæ.

The gravid female at hand had only embryos in an early stage, but no glochidia. The color of the placentæ could not be ascertained in consequence of the preservation in alcohol, in which they appear grayish-white.

The most characteristic anatomical feature of the present species is found in the marsupium, which is formed by the *four gills*, and has *subcylindrical placentæ*. In these particulars it resembles only one genus, *Fusconaia*, and also the rest of the anatomy does not differ from that of this genus.

However, in shell characters, this species is distinct from all known species of *Fusconaia*. In the latter we never see any sculpture on the disk and the beak sculpture is quite poorly developed, simple and concentric. In *Quincuncina* we have a rather complex zig-zag sculpture on the shell, following the subconcentric beak-sculpture.

Certain species of *Quadrula* have indications of the sculpture (*Q. cylindrica*, for instance); but these species differ from the present one by the lanceolate and compressed placentæ. However, there are two species which have been placed in *Quadrula*, *U. infucatus* Conrad and *U. kleinianus* Lea, which have a sculpture much like that of *Quincuncina burkei*. Of *U. kleinianus*, Lea (Journ. Acad. Phila., 1863, p. 404, and Obs. 10, 1863) has described the soft parts and, so far as the description goes, it agrees very well with the present species, except that the inner lamina of the inner gill is said to be free only half the length of the abdominal sac and that the anal opening is described as smooth; these are very insignificant differences, indeed. The most important character mentioned by Lea is that all four gills of *kleinianus* are marsupial.

H. H. Smith has sent me the soft parts of two males of *infucatus*. Also here the anatomy is the same so far as can be

observed. The inner lamina of the inner gill agrees with *Q. burkei*, while the anal opening is smooth as in *U. kleinianus*.

It is more than probable that *U. infucatus* and *kleinianus* also belong to our new genus *Quincuncina*, the type of which is *Q. burkei*. It is a very primitive form of the subfamily *Unioninæ* and stands, in its anatomy, close to *Fusconaia*, from which it differs, however, by the very peculiar sculpture of the shell, which, indeed, is rather unique among North American Naiades.

The generic diagnosis of *Quincuncina* would be as follows: Soft parts of the type of the family *Unionidae*, subfamily *Unioninæ*, much like those of the genus *Fusconaia*. All four gills marsupial, when charged not much swelled, and with sub-cylindrical (not lanceolate and compressed) placentæ.

Shell sculptured. The beak sculpture subconcentric, and followed upon the disk by bars of zig-zag type extending to a considerable distance and being much broken up so as to offer, at least upon parts of the disk, a quincuncial arrangement of nodules.

QUINCUNCINA BURKEI Walker. Plate I, figs. 1 and 4.

Shell of moderate size, subrhomboid, very inequilateral, sub-solid, somewhat inflated; beaks only slightly elevated above the hinge-line, their sculpture consisting of strong, subcircular ridges, stronger along the umbonal ridge and curved up sharply behind, fading out anteriorly and becoming nearly parallel with the growth-lines; anterior end regularly rounded; base line curved; posterior end somewhat produced, subtruncate, curving down rather abruptly and subangulated as it approaches the posterior point, which is below the median of the disk; posterior ridge strong and angulated by the junction of the surface ridges; posterior slope with strong ridges, curving upwards, extending from the posterior ridge to the posterior margin, these form a sharp angle on the posterior ridge with heavier ridges extending downward and forward, which become more or less broken and tuberculous toward the margin and much weaker on the anterior end where they assume a rather quincuncial arrangement; epidermis in mature shells black or sometimes dark brown, in young shells brown or occasionally greenish-

yellow, in which case obscure radial stripes of darker green are visible; pseudocardinals double in both valves; in the right valve the anterior is low and oblique, the posterior strong and erect; in the left valve the anterior is rather long and projects obliquely forward, the posterior is larger, erect and more or less split up; the laterals, two in the left valve and (usually) one in the right are only a little curved, that in the right valve is sometimes more or less inclined to be double; beak cavities not very deep nor compressed; anterior muscle scars well marked, the superior one deep and extending under the base of the anterior pseudocardinal; posterior muscle scars distinct, but not deeply impressed; nacre light purplish, deeper in the beak cavities and iridescent behind.

Length 51.4, height 31.5, diam. 18.5 mm.

Type locality, Sikes' Creek, a tributary of the Choctahatchee River, Barbour County, Ala. Also in the Choctahatchee River, Blue Springs; Pea River at Elamville, Clio and Flemings' Mill and Campbell's Creek near Clio, Barbour County, and Hurricane Creek, near Hartford, Geneva County, Ala.

Type, No. 41626, Coll. Walker. Cotypes in the Alabama State Museum and the Carnegie Museum.

This very distinct species was first discovered in the Pea River at Elamville, Ala., by Joseph B. Burke and is named after him by the request of the late H. H. Smith.

So far as known it is restricted to the Choctahatchee drainage system.

There is some variation in shape and considerable in sculpture shown in the series from the several localities listed above. As shown by the figure the type is quite distinctly biangulated at the posterior extremity, but in many specimens the upper angle disappears and the dorsal outline curves directly down to a sharp posterior point. The surface sculpture is some times nearly obsolete. This is quite marked in the shells from Hurricane Creek and the Pea River at Clio. On the other hand the series from Campbell's Creek are larger and have a much coarser sculpture than any of the other lots. The largest specimen seen is in this lot and measures 67.5 x 38 x 23 mm.

The species is extremely subject to erosion and for this reason

the type was selected from the series from Sikes' Creek, which were in much better condition than those from the Choctahatchee, which supplied the alcoholic material on which the generic diagnosis is based.

The description of the beak sculpture is based on a single young shell from the Pea River, which is nearly in perfect condition.

As stated in the generic diagnosis the affinities of this species lie clearly with *U. infucatus* Con. and *U. kleinianus* Lea. It differs from both in its more elongated shape and less compressed beak cavities. But the peculiar surface sculpture is the same in all.

NODULARIA CRONINÆ n. sp., Walker. Pl. I, figs. 2-3.

Shell of moderate size, oblong, subinflated, rather solid; beaks obtuse; situated at about one-third of the length from the anterior end, heavily radiately folded; anterior end regularly rounded; basal margin curved, fullest in the middle, more rapidly anteriorly and less so towards the posterior end; dorsal margin nearly straight to the end of ligament where it is obtusely angulated as it passes into the posterior margin, which is oblique, meeting the basal margin in a broadly-rounded point below the median line; posterior ridge low, rounded, wider and flatter as it approaches the posterior point; the posterior slope has a series of strong corrugations, which curve upwards to the posterior margin, the upper ones are prolongations of the beak sculpture, the lower ones are wider and more or less irregular and disappear below the median line; in front of the beaks is a series of small ridges curving upwards, the upper ones connected with the beak sculpture, the lower ones are not and gradually disappear before reaching the median line; the beak sculpture in the centre extends only a short distance from the incurving of the beaks; entire surface elsewhere smooth with very fine lines of growth; color brownish or reddish-yellow, slightly tinged with green towards the beaks and in that region with fine, radiating lines of a darker green than the general tinge; pseudocardinals in the left valve two, triangular, flattened, crenate, especially the inner one, on the edge, practically united

on the ligamental side, but separated below by an oblique groove, which receives the inner pseudocardinal of the right valve; pseudocardinals in the right valve two, the inner the larger and quite heavily crenated, the outer narrow and smooth; laterals two in the left valve and one in the right, rather slender and nearly straight; beak cavities deep; anterior muscle scars separate and impressed; posterior only slightly impressed; nacre salmon color, more intense towards the beaks, shading into bluish-white below the pallial line and at the ends where it is very iridescent.

Length (type), 42.1, height 28.5, diam. 19.2 mm.

Length (paratype), 38.3, height 24.3, diam. 17.6 mm.

Length (type), 100.00, height .677 %, diam. .456 %.

Length (paratype), 100.00, height .637 %, diam. 4595 %.

As shown by the comparative measurements the paratype is proportionately not quite so high and a little more inflated than the type as might well be expected from the fact that it is evidently a younger shell. The color is a brighter yellow, which extends to the basal margin, otherwise it is in all respects similar to the type.

Type locality, Zambesi River, at Mongu Sealu in the Barotze Valley, North Rhodesia.

Type, No. 59694, Coll. Walker. Paratype in the collection of Mrs. Howard of Somerset East, Cape Province.

Two specimens of this fine species were sent in by Mr. H. C. Burnup of Maritzburg, Natal, who received them from Mrs. Howard. They were collected by Mrs. Edwina Cronin after whom it is named.

It differs from all of the described African species in the distinctive sculpture of the anterior and posterior slopes.

In order to be sure that the species had not been already described I submitted photographs of the type to Dr. Louis Germain of the Museum d'Histoire Naturelle, Paris, the well-known authority on African mollusca, and he assures me that it is quite distinct from all of the described species.